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Medical management of venous ulcers

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ABSTRACT

Venous disease is the most common cause of chronic leg ulceration and represents an advanced clinical manifestation of venous insufficiency. Due to their frequency and chronicity, venous ulcers have a high socioeconomic impact, with treatment costs accounting for 1% of the health care budget in Western countries. The evaluation of patients with venous ulcers should include a thorough medical history for prior deep venous thrombosis, assessment for an hypercoagulable state, and a physical examination. Use of the CEAP (clinical, etiology, anatomy, pathophysiology) Classification System and the revised Venous Clinical Severity Scoring System is strongly recommended to characterize disease severity and assess response to treatment. This venous condition requires lifestyle modification, with affected individuals performing daily intervals of leg elevation to control edema; use of elastic compression garments; and moderate physical activity, such as walking wearing below-knee elastic stockings. Meticulous skin care, treatment of dermatitis, and prompt treatment of cellulitis are important aspects of medical management. The pharmacology of chronic venous insufficiency and venous ulcers include essentially two medications: pentoxifylline and phlebotropic agents. The micronized purified flavonoid fraction is an effective adjunct to compression therapy in patients with large, chronic ulceration.

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1. Introduction

Venous ulcers are the most common leg ulceration and the most severe manifestation of chronic venous insufficiency [1]. The prevalence of lower extremity venous ulcers has been estimated to be between 0.06% and 2%, and has been shown to increase with age [1]. Due to their frequency and chronicity, venous ulcers (VUs) have a high socioeconomic impact, in fact, treatment of VUs accounts for 1% of the health care budget in some Western countries [2]. In the United States, it is estimated that of the 2.5 million patients with chronic venous insufficiency, 20% are affected by VUs, with an annual cost of \$2.5 billion to treat 6 million patients every year [3]. On

a per-patient basis, the direct cost of treating VUs is \$2,500 per month, despite the fact that most patients can be treated in an outpatient clinic [4–6]. This reflects the high intensity of care for patients with venous ulcers, including facility costs, dressing supplies, wound care nurses, physical and occupational therapists, paramedic staff, and physician reimbursement [4–6].

The initial evaluation of patients with VUs should include a thorough medical history and physical examination [5,6]. Signs of chronic venous insufficiency, such as varicose veins, corona phlebectatica, stasis dermatitis, hyperpigmentation, and sites of previous skin ulceration should be noted. Critically important in the initial evaluation is overall physical

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Table 1 – CEAP (clinical, etiologic, anatomic, and pathophysiologic) classification of lower limb venous disease.

Clinical classification	
CO	No visible or palpable signs of venous disease
C1	Telangiectases or reticular veins
C2	Varicose veins
C3	Edema
C4a	Pigmentation and/or eczema
C4b	Lipodermatosclerosis and/or atrophie blanche
C5	Healed venous ulcer
C6	Active venous ulcer
CS	Symptoms, including ache, pain, tightness, skin irritation, heaviness, muscle cramps, as well as other complaints attributable to venous dysfunction
CA	Asymptomatic
Etiologic classification	
Ec	Congenital
Ep	Primarily
Es	Secondary (post—thrombotic)
En	No venous etiology identified
Anatomic classification	
As	Superficial veins
Ap	Perforator veins
Ad	Deep veins
An	No venous location identified
Pathophysiologic classification	
Pr	Reflux
Po	Obstruction
Pr,o	Reflux and obstruction
Pn	No venous pathophysiology identifiable

From O'Donnell and Passman [5], adapted with permission.

and biochemical nutritional assessment. Use of the CEAP (clinical, etiologic, anatomic, pathophysiologic) Classification (Table 1) and the revised Venous Clinical Severity Scoring System is strongly encouraged [5,6]. The differential diagnosis should include other medical conditions that could potentially lead to development of a lower extremity ulcer (Table 2) [5,6]. Initial and serial measurements of wound size and depth are recommended; in addition, culture of the wound and biopsy of chronic or recurrent ulcers should be considered.

The vascular laboratory is an essential adjunct to the physical examination in the evaluation of patients with VU. Every patient should undergo a comprehensive duplex ultrasound testing for superficial and deep vein reflux, assessment of deep vein patency, signs of prior deep vein thrombosis, and measurement of ankle brachial systolic pressure index [5,6]. Imaging of inferior vena cava and iliac veins using computed tomography or magnetic resonance imaging is recommended for patients with a history of persistent venous ulcers, or venous duplex ultrasound evidence of ilio caval obstruction, such as diffuse deep venous reflux, nonphasic common femoral vein velocity spectral waveforms, or reduced flow augmentation with distal thigh compression [5,6]. Catheter venography with intravascular ultrasound should be performed in those with an indication for venous intervention, such as iliac vein stenting [5,6].

The goal for the care of patients with VUs is to reduce ambulatory venous hypertension and lessen the related inflammatory reaction underlying their development. The

management of VUs requires a comprehensive approach that includes lifestyle modification, compression therapy, adequate wound care, and pharmacologic interventions.

2. Lifestyle modification

The most important recommendations for lifestyle modification in patients with VUs are avoidance of vigorous exercise, moderate physical activity, and leg elevation [7].

2.1. Exercise

In several studies, it has been noted that advanced chronic venous disease, including VUs, is associated with overall poor mobility status [7]. Increased mobility and moderate physical activity have been clearly proven to promote ulcer healing and to be an adjunct to compression therapy [7]. Roaldsen et al [8] observed that walking speed, endurance, and self-perceived exertion were severely impaired in 34 women ranging in age from 60 to 85 years old, with previously healed or current VUs compared with age-matched controls [8]. In the same cohort of patients, it was noted that ankle plantar flexion and dorsiflexion were significantly reduced if active ulcers were present, primarily due to pain. In the care of patients with VUs, the importance of a supervised exercise program and adequate pain control should be strongly emphasized in order to improve patients' overall functional capacity.

2.2. Leg elevation

Leg elevation aids venous drainage, increases blood return to the heart, reduces ankle edema, and enhances cutaneous microcirculation [9]. Leg elevation has been associated with a median 45% transcutaneous flux increase by Doppler fluximetry in patients with lipodermatosclerosis and increased transcutaneous oxygen saturation levels in patients with VUs. Lower rates of recurrence were noted in patients with C5 disease treated with compression therapy and longer leg elevation times (33 min/d) [10].

2.3. Rationale of compression therapy

Compression therapy is an essential component in the care of patients with chronic venous insufficiency and, when combined with wound care, is the foundation of the treatment of venous ulcers. The goal of compression therapy is to attenuate the most important factor underlying the pathogenesis of varicose and vein ulcers, that is, reflux-induced venous hypertension. The normal standing resting venous pressure in the lower extremities is approximately 60 to 80 mm Hg [11]. Major hemodynamic effects can be expected with an interface compression between 35 and 40 mm Hg [11]. An externally sustained compression of 60 mm Hg has been shown to be the safe upper limit, even in patients with an ankle brachial index ≥ 0.5 [11]. Several animal and clinical studies have documented that compression therapy promotes improvement of the cutaneous microcirculation and overall ulcer healing [12]. Enhancement of lymphatic drainage,

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